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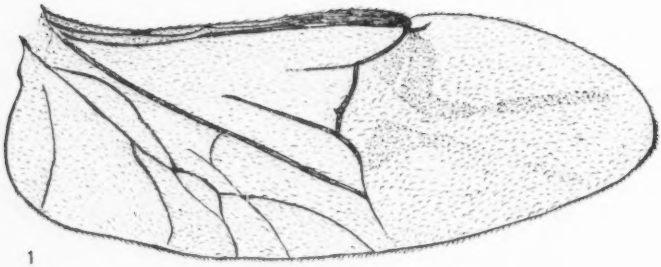

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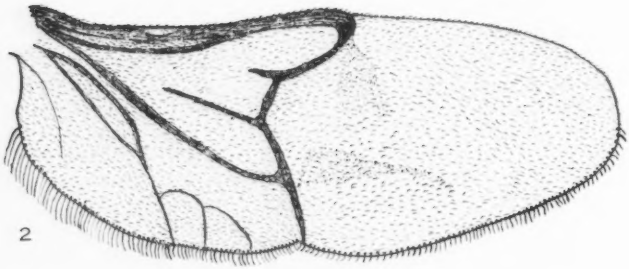

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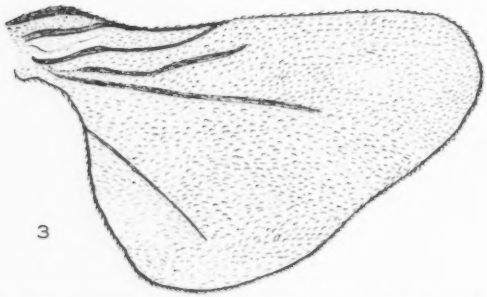

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1—HELICHUS (DRYOPS) FASTIGIATUS SAY. 2—LIMNIUS ELEGANS LECONTE. 3—STENELMIS CRENATUS SAY.—SEGAL.

ENTOMOLOGICAL NEWS

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The Hind Wings of Some Dryopidae in Relation to Habitat (Coleop.).

By BERNARD SEGAL, Rochester, New York.

(Plate III.)

The small aquatic beetles of the family Dryopidae are remarkable in their habits as well as in their morphology. A study of the structure of the hind wings of these beetles reveals some interesting facts. They occur within the family in three types: 1) fully developed. 2) reduced. 3) vestigial.

A direct correspondence was found between the type of the wing and the habitat of the species.

The fully developed hind wing is elongate and rounded at the apex. The entire surface is thickly clothed with fine fixed hairs, or aculeae. These are seen under the microscope to cover the wing membrane as well as the veins. The outer margin is fringed with longer and thicker hair. These can be seen with the naked eye forming a border from the anal angle to the mid-apical angle. Their bases of insertion are annular, thus distinguishing them from the surface hairs. The fringe-setae are longest at the anal angle and decrease in size as they approach the apex.

The fully developed wing consists of two distinct areas, the venation area occupying the proximal 2/3 of the wing, and the clear, transparent, apical area. The limits of these two areas are marked by a slight constriction on the costal margin, and a deeper incision on the outer margin.

The venation of the hind wing is of the Cantharid type. Using Forbes' system of vein nomenclature, and compared with the hind-wings of European species of Dryopidae figured by Forbes (1922) and by Kempers (1900), the venation may be interpreted as follows:

1. Costa, subcosta and radius all arise separately at the base of the wing, run independently for a short distance and then

crowd closely together towards the costal margin, and terminate roundly as a thick vein at the end of the venational area of the wing.

2. Radial sector is atrophied at the base and appears as a recurrent segment of the radius near the distal end of the venation area.

3. Media has also lost its base but is somewhat longer than Rs. It starts at about the mid-venation area, and bends towards the outer margin of the wing. But before reaching the margin it coalesces with cubitus forming a loop.

4. Cubitus originates at the base and runs obliquely across the venation area toward the outer margin, where it joins media before reaching the margin.

5. Four anal veins are usually present, but these vary and offer difficulties in tracing their courses.

6. Cross-vein R-M obliquely joins radial sector and media.

7. There are usually two irregular dark spots in the apical area which are probably traces of lost veins.

In the reduced type of wing, the clear apical area is shortened or lost entirely, and the anal veins are decreased in number and less distinct.

Based on the degree of development of the hind wings, the genera of Dryopidae would be grouped in the following manner:

1. *Helichus* (*Dryops*) with the most fully developed wings in all its species is evidently the most primitive and should be placed at the beginning of the series.

2. *Limnius* should follow, with fully developed wings in the three species occurring in New York, with fewer and more abbreviated anal veins than in *Helichus*.

3. *Helmis* with at least one species, *Helmis quadrinotatus*, having individuals with short wings. The reduction consists, besides the loss of the clear apical area, in the disappearance of the cross vein, and a further decrease in the number of the anal veins.

4. *Stenelmis*, with the most common species, in our locality, *Stenelmis crenatus* Say, having vestigial wings. Specimens of this species were collected at different seasons and situations, and more than 100 beetles were examined for their hind wings.

5. *Macronychus* with the only species that occurs in New York, *M. glabratus* Say, reaching the highest degree of degradation. The hind wings of this species are short, rounded, scale-like rudiments.

Because of the lack of *Ancyronyx* in our vicinity, no great number of specimens were available for dissection. The few that were examined, however, exhibited the same rudimentary type of hind wings as that found in *Macronychus*.

None of the species of *Dryopidae* are known to take wing, although their nearest relatives, *Psephenus lecontii* of the family Psephenidae, and *Lara avara*, of the family Laridae, fly with great agility. Considering the habits of the Dryopidae, one is led to the following conclusions:

These insects at first retreated into swiftly running waters; gradually they became adapted to quiet waters, and with it lost use of wings. *Psephenus* inhabits torrents and rapids. It is also found on overhanging bushes and emerging stones. *Lara* is found riding the current on logs in swift, cold streams (Darlington, 1929). Both of these can fly as well as swim. *Helichus, Limnius,* and *Helmis* are dwellers of the underside of stones and logs in small creeks, while *Machronychus* and *Ancyronyx* have retreated into quiet waters, ponds, and swamps.

The dangers of the quick-running current necessitates the use of the wing. The further adaptation was in the direction of going into safer waters, under stones, and the ability to retain the air supply for a longer period, thus being able to live in the safety of the pool and among the stones and pebbles on the bottom of streams and creeks. This new habitat shifted the function of locomotion from the wings to the legs, and those species with the most reduced wings have the longer legs.

A study of the larval forms bears witness to the way in which their adaptability to aquatic life advanced. Those species that are found in the riffles and having fully developed wings have, in the larval stage, laterally prolonged lobes on the body segments. These lobes are used to hold fast to the stones. They decrease as the habitat changes from swift running to quiet waters. The larval form ranges from the limpet-shaped *Psephenus* and *Helichus* to the nearly circular larvae of *Ancyronyx*.

The trend of adaptation, then, has been:

1. From semi-aquatic to fully aquatic habitat.
2. From the dangers of swiftly running, to the safety of quiet waters.
3. Loss of wings and increase in length of legs and claws.
4. Change in body structure of larvae, from circular, limpet-shaped, or lobed, to round, worm-like.

LITERATURE CITED.

DARLINGTON, P. J., JR., 1929. On the Dryopid beetle genus *Lara*. Psyche, Vol. XXXVI, pp. 328-331.

FORBES, W. M. T., 1922. The wing-venation of the Coleoptera. Ann. Ent. Soc. of Amer., Vol. XV, pp. 328-345.

KEMPERS, K. J. W., 1900. Het Adersystem der Keverlengels. Tyd. voor Ent., Vol. XLIII, p. 192.

WEST, L. S., 1929. Life history notes on *Psephenus lecontei* Lec. Battle Creek College Bull., Vol. III (No. 1).

EXPLANATION OF PLATE III.

Fig. 1. Hind wing of *Helichus fastigiatus* Say. Fully developed type.

Fig. 2. Hind wing of *Limnius elegans* LeConte. Fully developed, fringed.

Fig. 3. Hind wing of *Stenelmis crenatus* Say. Reduced type.

A Corduline Dragonfly from Mexico (Odonata).

By JAMES G. NEEDHAM, Cornell Unversity, Ithaca, New York.

In a small collection of insects, that was made incidentally to a botanical excursion in Mexico by Dr. L. H. McDaniels of Cornell University, there was a single dragonfly, which, by rare chance, is the first Corduline dragonfly to be recorded from that country. It is a fine male specimen of a new species of the genus *Gomphomacromia*.

The rarity of neotropical Cordulines (and of Macromiines as well) has been noted by Dr. Calvert (Biol. Centr. Amer., Neuropt., pp. 197-8, 1908), Dr. Ris (Archiv. of Naturg. 82:174. 1916), and others. The range of *Gomphomacromia* is along the backbone of the continent. The type species is the antipodean *G. paradoxa* Brauer, coming from Chile; *G. fallax* McL. is central, coming from Ecuador and adjacent parts of Brazil; while this new species is northern. Other species that in times past have wrongly been placed in *Gomphomacromia* have gradu-

ally been eliminated, the last one *Neocordulia volxemi* Selys, by myself in Annals of the Entomological Society of America 1:279, 1908, where I also showed the affinities of this genus to be with Cordulines rather than with Macromiines.

The three species are readily separable by color characters, as follows:

1. Front of synthorax blackish, with a pair of distinct oblong antehumeral yellow spots.....*paradoxa*
   Front of synthorax brown with a yellow longitudinal stripe on the middorsal carina, and without distinct antehumeral pale spots 2
2. Abdominal segments 9 and 10 in the male black above, *fallax*
   Abdominal segments 9 and 10 in the male yellow above, *mexicana,* n. sp.

Gomphomacromia mexicana sp. n.

Length 45; expanse 58; abdomen 33; hind wing 27.

This is a slender blackish species, having the thorax striped and the abdomen spotted with yellow. Face olivaceous, darker across the middle of the labrum, and lighter on the broadly concave prominence of the frons. Labium yellowish. A black cross stripe through the ocelli runs narrowly down the rear of the frons along the margin of the eyes to the blackish mandibles. The low transversely depressed vertical tubercle is brown. Occiput brown, paler in the middle and fringed on the margin with long tawny hairs. This fringe is continued down the carina at the rear of the eyes, the hairs becoming whitish. Rear of head black except on the occiput, and a small spot below the lateral eye tubercle.

Prothorax blackish above with a yellow transverse front border. Synthorax blackish, clothed in front with long tawny hairs. The ridges of carina, crest and collar are narrowly yellow. There is an obscure, pale brownish area before the humeral suture, and there are two broad yellow oblique bands each side, one beneath each wing.

Wings hyaline, a little flavescent at base and with black veins and stigma. Ante- and postnodals forewing 7:8 and hind wing 5:9, with those in the area R1 near the stigma becoming oblique, and the first of the two cross veins under the stigma simulating a true brace vein. There is an extra bridge crossvein (two in all). There are no planates. The triangles are free from cross veins. Beyond the triangle in the front wing are first two rows then one row (for most of the distance), then a rapidly increasing number of rows of cells where veins M4

and Cu1 rapidly and widely diverge to the wing margin. There are three cubito-anal cross veins (counting the one that bounds the uncrossed subtriangle) in the fore wing, and two in the hind wing. The triangle in the hind wing is a little beyond the arculus, and the sectors of the arculus are short stalked, and about equally stalked, in both wings. The anal loop is not footshaped, lacking the toe: it is short, composed of six cells in two rows that are separated by an ill-defined and very zig-zag midrib. The male anal triangle is two-celled and bordered by a gray membranule.

The legs are black, with the under side of the front femur yellow. The claws appear bifid at tip, the stout inferior tooth being almost at the apex.

The abdomen is quite slender, slightly thickened on a few segments at both ends. Segments 1 and 2 are thinly clad with long tawny hairs, and 10 and appendages with shorter denser black hairs. The color is blackish with a pair of submedian dorsal yellow spots on segments 2-7, large on 3 and 7, small on 2 and 4-6: dorsum of 9 and 10 mostly yellow; apical border of 1 olivaceous; sides of 2 beneath and the broad platelike hamules, yellowish. Appendages black, as long as segments 9 and 10 together, the superiors regularly decurving to their obtuse and slightly dilated tips, which lie in the wide apical notch of the broad plate-like, slowly upcurving inferior. The latter is concave and shining above, convex and hairy beneath. There is a slight pale angulation of the under side of the superiors near the middle.

This species is near *G. fallax*. It agrees with that species and differs from *G. paradoxa* in larger size, in having five or six cross veins between the oblique vein and the apparent brace vein at the stigma (postnodals of the second series), where that species usually has three; also, in having the triangle of the hind wing more distant from the arculus, and the origin of vein A2 more distant from the anal crossing (Ac).

This species differs from *G. fallax* in the large pale yellow campanulate spots that nearly cover the dorsum of abdominal segments 9 and 10 and in the form of the superior appendages of the male, these being in *G. mexicana* longer, much more strongly decurved to their blunt clavate tips.

Type C. U. No. 1127. A single male specimen collected by Professor L. H. MacDaniels at Teotlhuacan, MEXICO, on July 26, 1921, and now in the Cornell University collection.

Prothetely in an Elaterid Larva (Coleop.).*

By C. A. THOMAS, Pennsylvania State College.

In the spring of 1930 the writer dug up from his garden a number of larvae of *Monocrepidius lividus* DeG., a rather common wireworm in southeastern Pennsylvania. These larvae were placed in a cellar, in individual salve cans, and remained there throughout the remainder of their larval existence, or until they pupated in midsummer. The temperature of the cellar during this period gradually rose from 55° F. to 72° F., but at no time was it warmer than the latter temperature. Pupation among this lot of *M. lividus* larvae began in mid-June, and they had all, except one, pupated by mid-August. Although this individual was apparently under practically the same conditions of temperature, soil moisture, food, etc., as the others, it had not shown any indication of going into the pupal stage when examined on August 25. At the next examination on September 8, however, it was found that this larva had molted. Instead of a normal pupa, however, there was found an abnormal individual combining some characters of the pupa with those of the larva. An examination of the literature showed that this phenomenon is very rare among Elaterid larvae, only one other case, that by Hyslop (1916) having been recorded, although it is occasionally found among larvae of other families and orders, as noted in the appended list of references.

Since this phenomenon is so rare, this specimen is here described and figured in detail:

Head. Mouthparts apparently normal in shape and size, and typically larviform, except for a slight distension of the membranes of the palpi. Antennae larviform, slightly distended. Mandibles normal. A pigmented, pupiform eye arises from a pigmented area on each side of the head, just behind the base of the antenna (fig. 3). These eyes closely resemble those of the *Melanotus* larva described by Hyslop.

Thorax. Prothorax normal throughout, without any distension of the membranes. Meso- and metathorax each with a

* Publication authorized by the Director of the Pennsylvania Agricultural Experiment Station, January 16, 1933, as Technical Paper No. 578.

pair of sac-like wing pads, somewhat pupiform, but shorter and more bag-like, and without any indication of the striation found in the normal pupal wing. The mesothoracic wings are more than twice the size of the metathoracic wings. All wings seem to rise directly from the integument of these segments, with no visible sutures (figs. 1 and 2).

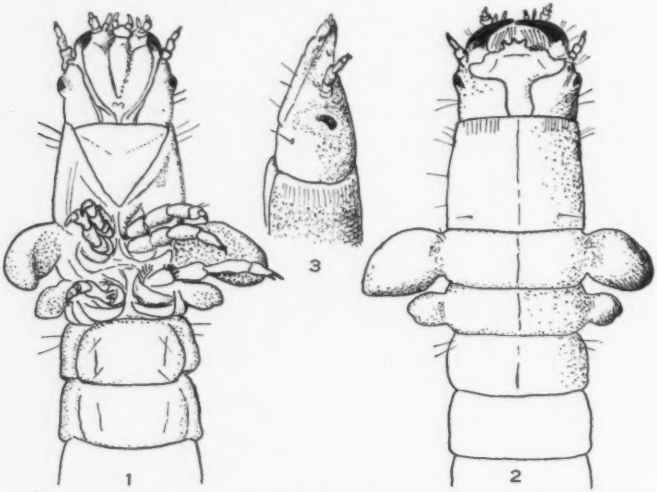

Fig. 1—Ventral view: Details of eyes, extended palpi and antennae, legs and wing-pads.
Fig. 2—Dorsal: Eyes and comparative size of wing-pads.
Fig. 3—Lateral view of head, showing the "eye".

Legs. The trochanters and coxae of all legs are larviform except that the heavy chitinous bristles or spines of the pro- and mesothoracic coxae are very much reduced in size and number; those of the metathoracic legs are about normal for the larva. Femora of all legs larviform, but membraneous and without spines except on the metathoracic legs. Tibiae pupiform on all legs. Tarsi pupiform, except for the prothoracic legs (fig. 1).

Abdomen. Entirely larviform, except that the row of bristles on the under side of the tenth segment is greatly reduced in size and number. No papillae are found on any of the segments (plate 1).

The molted skin from which this specimen emerged shows no unusual developments of any portion of the body or legs.

With only one such abnormal specimen at hand, it is impossible to prove a definite cause for this phenomenon. As noted above, the lot of larvae containing this specimen was not exposed to any temperature higher than 72° F. during the several months they were in the cellar. Hence high temperature can probably be ruled out in this instance, as the larvae are often exposed to considerably higher temperatures than this outdoors. Plenty of food was supplied to all members of this lot of larvae. Although the soil moisture was not accurately measured, there surely were other cultures which had approximately the same moisture content as that in which this abnormal specimen appeared. Such larvae undoubtedly encounter great extremes of soil moisture and temperature in the field, although, of course, they are generally able to leave very dry soil and go into the moister soil below. I have never seen this abnormality among many thousands of larvae outdoors, and it is interesting to note that practically all of the instances of this phenomenon described in the literature were among larvae being reared under artificial conditions.

The following list of references to the records of this phenomenon among insect larvae is appended in the hope that it may be of use to others interested:

References.

Bataillon, E.—1893—La Metamorphose du ver a soie et le determinisme evolutif. Bull. Scient. France et Belgique, vol. 30, p. 18.

Stated that the accumulation of CO_2 is a controlling factor in bringing about metamorphosis. Any artificial condition which would vary activity of the enzymes or change the concentration of the CO_2 would alter the phenomena concerned in metamorphosis, and thus might cause these abnormalities.

Barber, H. S.—1914—Prothetely or semi-pupal stage in *Lopheros fraternus* Rand. Psyche, XXI, p. 190.

Some individuals brought indoors and kept at abnormally high temperatures became prothetelous. He believed that certain phases of metamorphosis were hastened while other phenomena remained unaltered.

Boving, A. G.—1906—Bidrag til kundskaben om Donaciin larveneres natur-historie, p. 241, Copenhagen, Denmark.

Transl. into English-Sonderabd. Int. Rev. Hydrobiol. Hydrograph, p. 101, 1910.

Recorded an abnormal *Donaciid* larva (Coleoptera).

BUSCK, A.—1897—Larvae of *Anthrenus varius* showing wing pads. Proc. Ent. Soc. Wash., vol. 4, p. 123.

Found six larvae of *A. varius* showing this phenomenon.

CARPENTER, G. H.—Insect Transformation, p. 257. Methuen & Co., London.

Stated that such precocious appearance of wing rudiments is instructive because if we accept these abnormalities as examples of reversal to an old ancestral condition, we conclude that among the ancestors of primitive endopterygote insects, wing rudiments appeared outwardly before the pupal stage in the life history.

CHAPMAN, R. N.—1926—Inhibiting the process of metamorphosis in the Confused Flour Beetle (*Tribolium confusum* Duval.).

Journ. Exptl. Zoology, vol. 45, p. 293.

Experiments showed that abnormalities in his *T. confusum* larvae were associated with an undetermined gas produced by the adult when it was irritated, although this probably was not the only cause. Only 10% of the larvae exposed to this gas showed abnormalities, and none were found among the controls. Mature larvae emerged with a combination of larval and pupal structures, and pupae emerged as deformed adults. The phenomenon seems to be Metathetely.

DAWSON, R. W.—1931—Report of two cases of metathetely in Polyphemus larva (*Telea polyphemus* Cramer). ENT. NEWS, XLII, p. 125.

Two metathetelous larvae of *T. polyphemus* appeared from eggs incubated at 25° C. for 11 days, then exposed to progressively declining temperatures for periods of 3 to 5 days. Dawson suspected a causal connection with the descending temperatures. The head capsule, mouth parts and antennae were distended; the thoracic legs and prolegs partly so.

DEWITZ, J.—1905—Untersuchungen uber die Verwandlung der Insektenlarven. II. Archiv für Anat. u. Physiol., Physiologische Abt., Suppl. Band, p. 389.

Believed that enzymes are not present in the egg, but begin to develop in the young larva, reaching greatest activity in the larva about ready to pupate. After pupation, enzyme activity diminishes until the adult, like the egg, exhibits no activity of these particular enzymes.

HAGEN, H. A.—1872—Stettin. Ent. Ztg., p. 392.

Found Prothetely in larvae of silk worms, *Bombyx mori.*

HEIN, S. A. A.—1920, 1924—Studies on variation in the

Meal Worm (*Tenebrio molitor* L.). Biological and genetical notes on *T. molitor*. Journ. of Genetics, vol. 10, p. 227. II—Variations in tarsi and antennae-Ibid. 1924, p. 1.

Described *T. molitor* larvae with rudimentary wings. These were found only in individuals with abnormally long larval stages, in which pupation was delayed or inhibited.

HEYMONS, R.—1896—Flugelbildung bei der Larve von *Tenebrio molitor*. Sitzungber. d. Ges. Nat. Fr., Berlin, p. 142. 1899—The development of wings in the larvae of *T. molitor*. Entomologists Record, vol. 11, p. 67.

Described winged larvae of *T. molitor*. Antennae had six segments rather than the normal four. Abdominal tergites and eyes resembled the pupal condition.

HYSLOP, J. A.—1916—Prothetely in the Elaterid genus *Melanotus*. Psyche, XXIII, no. 1, 2 pl.

Found a specimen of *M. communis* Gyll. in this condition in the laboratory. He believed that an abnormal humidity at or shortly before the time of pupation was the causative stimulus of this phenomenon. This individual appeared during a period of minimum moulting immediately preceding a very abrupt and extensive moulting period. It is predominately larviform, but with pupiform eyes and well developed, non-striated wing pads. "This case seems to be a carrying forward of larval characters into the pupal stage rather than a carrying back of pupal characters into the larval stages."

KEMNER, A.—1914—Ent. Tidsk. (Swedish), XXV, pt. 1-2, p. 87.

KOLBE, H. J.—1903—Uber vorschnelle Entwickelung (Prothetelie). Allgem. Zeitsch. fur Ent., Bd. 8, p. 1-9, 25-30.

Discussed premature development of imaginal antennae, maxillae and legs in larvae of *Dendrolinus pini* L. (Lepid.) He called this "Prothetelie," meaning "to run before completion." Stated that the histoblasts of the abnormal organs had metamorphosed before the entire insect had completed its metamorphosis, resulting in a larva with the wings, maxillae and legs of a pupa.

LENGERKEN, HANNS VON—1924—Prothetelie bei Coleopterenlarven. Zoologischer Anzeiger, v. 58, p. 179, 323, 3 figs.

PEYERIMHOFF, P. DE — 1911 — Sur un cas de Prothetelie-*Malthodes batillifer* Cantharides. Bull. Soc. Ent. France, p. 327.

PRUTHI, H. SINGH—1924—Studies on insect metamorphosis. I. Prothetely in Mealworms (*Tenebrio molitor*) and other insects. Effects of different temperatures. Proc. Cambridge Philosoph. Soc. (Biol. Sciences), v. I, no. 3, p. 139.

Stated that Prothetely had never been observed in true wireworms, though not uncommon in Tenebrionid larvae. Believed

it due to retarded development. Factors promoting prothetely: I—Prolongation of larval life by keeping larvae at too high or too low temperatures; II—Direct effect of temperature. The metamorphosis of the larva is inhibited, but there is a tendency for the pupal organs to appear at the proper time. Therefor these organs are not mature. Experiments showed that very high temperatures delayed the development and produced more abnormalities. The metamorphosis was inhibited, while the pupation was overdue, but there was a tendency of the organs to appear at the proper time. Pruthi calls this Neoteny or inhibited development.

1927—Prothetely in insects. Nature, March 12.

Summary of the same information as above.

RILEY, W. A.—1908—The abnormal appearance of external wing buds in larvae of holometabolous insects. ENT. NEWS, vol. 19, p. 136.

Riley found prothetelous larvae of a common Pyrochroid beetle, *Dendroides canadensis*, with the compound eyes and antennal segments of the adult partially developed. He suggested that this is not atavism, i. e., a harking back to the period when the larvae bore wings, but rather seems to be a premature development in which characters normally present in the pupal stage are present abnormally in the larva.

SILVESTRI, F.—1905—Metamorfosi e Costumi della *Lebia scapularis*. Redia, 11.

Found a pro-nymphal stage with short external wing rudiment preceding the pupal stage in *L. scapularis*. This also occurs in some males of the parasitic Strepsiptera.

STRICKLAND, E. H.—1911—Some parasites of *Simulium* larvae and their effects on the development of the host. Biol. Bull., vol. 21, p. 302.

Found that the action of the parasite somehow prevented the wing histoblasts from developing normally. He called this "Metathetely, or running behind completion," meaning that the whole insect had metamorphosed normally except for the wing pads, which were greatly retarded and reduced. He believed it due to keeping the larvae at abnormally high temperatures. This probably results in an increased supply of the enzymes which cause the histoblasts to develop.

TRAGARDH, I.—1912—Fauna och Flora, p. 245.

WILLIAMS, F. X.—1914—Prothetely in the Larva of *Photuris pennsylvanicus* DeG. Psyche, XXI, p. 126.

Found *P. pennsylvanicus* larva with a pair of well-developed wing pads on the meso- and metathorax. These pads were developed indoors under artificial conditions. Other larvae remaining outdoors did not show this condition.

A New Lycaenid Transition Form (Lepid.)

By C. N. Rudkin, San Marino, California.

Lycaena xanthoides (Bdv.), tr. form **gunderi,** new tr. form.

Lycaena xanthoides (Boisduval) is described "from the mountains of California" by its author in part as follows: "Underneath of a russet gray, with a great number of black points . . ." (Dessous d'un gris roussâtre, avec une infinité de points noirs . . .) (Ann. Soc. Ent. Fr., (2), 10, 292, 1852.) Most specimens coincide roughly in this respect with the description, but in most examples the spots are somewhat grayish and are centered with minute white dots. (Examples of race *luctuosa* (Watson & Comstock) (Bull. Am. Mus. Nat. Hist., 42, 453, 1920) from the type locality in the Tehachapi Valley, Kern County, California, nearly always have the dots of a brilliant black with the white centers entirely absent, although this characteristic is not noted by the authors in the original description.)

Specimens of *xanthoides* from other localities vary considerably in the intensity of the black markings of the secondaries, and occasional specimens turn up in which the black markings are entirely absent from the underside of the hind wings. Otherwise these specimens appear to be exactly the same as typical examples, except that the females of the type series have considerably less of the light markings on the upper surface of the primaries than the average of the species. Intermediate specimens are found in which some of the spots are completely absent while others are of full intensity.

Holotype ♂ July 16, 1932; Bouquet Canyon, Los Angeles Co., California: *Allotype* ♀ June 1, 1921; same locality: both deposited in the type collection of the Academy of Sciences at San Francisco. *Paratypes*: 2 ♂'s June 21, 1931: 2 ♂'s May 14, 1932: 2 ♂'s May 21, 1932: 1 ♂ May 26, 1932: 1 ♀ June 1, 1921: 6 ♀'s May 26, 1932: all paratypes from same locality as the holotype and allotype. One pair of paratypes deposited in the Gunder collection at Pasadena, Calif.; the remainder held in the author's collection. Classification: change of pattern; immaculism, well developed.

These transition forms represent the extreme development of a tendency to immaculism well-marked in this species, and also apparent in the nymotypical forms of several species of the Lycaeninae (Chrysophanjnae of authors) and in transition

forms of other species of this sub-family. Melanifusism, the opposite tendency, of which this sub-family might theoretically be capable, has not yet come under my observation in this species.

Named for Mr. J. D. Gunder of Pasadena, Calif.

New Records of Odonata for the United States (Lblidae)

I have a nymph of *Miathyria marcella* sent me by Dr. W. L. McAtee from Florida. Being a nymph it is clearly a resident—not a storm-wind scatterling; and this adds another genus to our known fauna.

Dr. McAtee has obtained for me the following information concerning this specimen:

It was collected about midway between Fort Pierce and Okeechobee, Florida, in a roadside ditch created by the construction of State Highway No. 8. This specimen was taken in a minnow seine while collecting fishes. The water was less than three feet deep and contained an abundance of bushy pondweed (*Naias guadalupensis*). Short-nosed gars, sun fishes, warmouth bass, bullheads, and several species of killifishes were abundant in this ditch. The water was fresh at the time of this visit, but the presence of blue crabs (*Callinectes* sp.) would indicate that it had been mixed with brackish water from the Fort Pierce end of the ditch at some fairly recent date. The collection was made March 23, 1932 by F. M. Uhler and A. L. Nelson of the Biological Survey.

Also, I have seen a specimen of *Dythemis velox* that was collected near Auburn Alabama. Hitherto I have not known of its occurrence eastward of Texas.

J. G. NEEDHAM, Cornell University, Ithaca, N. Y.

Society Reduces Dues.

At its first monthly meeting for the year 1933, the Lorquin Entomological Society of Los Angeles, California, cut its annual membership dues exactly in half. A few years ago the dues of the Society were $2.50. This amount has gradually been reduced until now the yearly payment is only 50 cents, which is no more than enough to cover the cost of routine expense. It has been found that this policy of low cost membership keeps older members from resigning and attracts new and younger members as well, especially during these times of "depression." Present membership is 60. Average attendance 35.

F. W. FRIDAY, *Secy.*

An Unusual Invasion of the Clothes Moth, Tineola bisselliella (Lepid.: Tineidae).

By GLENN W. HERRICK, Cornell University, Ithaca, New York.

Clothes moths have either become more abundant and more injurious during the past twenty years or householders have come to realize more keenly the depredations of the larvae. Nevertheless, we have not thought of this frail moth as having a tendency or indeed the capability of developing in enormous numbers even under most favorable conditions and then of migrating to dwelling houses at some distance from its breeding place. Given the proper conditions there is, however, no logical reason why clothes moths should not develop in swarms as do many other insects. Indeed our recent experience with these moths indicates that an abnormal increase in the numbers of them comparable to the outbreaks of other insects is an accomplished fact. The following quotation from a letter of one of our correspondents will afford the setting for the incident, the sequel of which, to say the least, is interesting.

"In a recollection covering nearly 50 years, I cannot recall anything approaching the invasion of moth in my residence from which I am at present suffering, and I am very seriously concerned with the fear that hundreds of dollars' worth of damage may be done to various woolen fabrics in my house unless drastic measures are taken without delay.

About two months ago, as nearly as I can recall it, we began noticing in the evening occasional moth millers flying in our living rooms and would usually try to kill them with the fly swatter or the hand. The number of these moth millers has grown steadily greater until at present we feel almost as though we were being overwhelmed with them. In a small entrance hall I have killed, evening after evening, 25 or 30 of them with a fly swatter as they would fly about or crawl over hats and coats hanging on the hat rack.

I went to the expense of having a large cedar chest built and installed in an upstairs bedroom for my own rather extensive wardrobe, and have been very careful at all times to keep this tightly closed. I was alarmed recently to find that a number of these millers had gained entrance and were crawling over several hundred dollars' worth of suits and overcoats with no regard whatever for the supposed repulsive properties of the cedar.

I have three oriental rugs that at a fair appraisal are worth

close on to a thousand dollars. These are all employed in rooms where there is a flood of daylight on them at all times, and I have gone on the theory that the moth will not eat fabrics which are exposed to strong light. However, during the recent absence of Mrs. P. and myself, an employee ran a vacuum cleaner over these carpets after the house had been closed up for two or three days with the shades drawn, and said that he got an astonishing number of the moth in the vacuum cleaner; so many that he dumped the bag from the vacuum cleaner on to an open fire and burned them."

Further observation, at our suggestion, on the part of our correspondent disclosed the undoubted fact that the moths were entering the house from the outside particularly through the screen doors both at the front and at the back of the house. It also developed that the neighbors in the same block were suffering from a similar invasion of the moths. The whole situation appeared so unusual that a personal investigation seemed worth while.

It developed in our investigation that a large warehouse which stood in this block about 150 feet back from the street and about the same distance from the back door of our correspondent's home was rumored to have some stored wool in one of the rooms. When the Superintendent of the warehouse had been found and consulted he confirmed the rumor and very courteously allowed us to make an examination of the wool. In one of the rooms 30 feet square and 9½ feet high some 20 tons of raw wool, between 5000 and 6000 fleeces, were stored. The Superintendent assured us that some of the wool, probably the larger part of it, had been in the warehouse for at least two years. Each fleece was simply rolled up and tied tightly with a string and then tossed into the pile. Here was raw, greasy unwashed wool heavily infested with the larvae of the common clothes moth, *Tinola bisselliella*. The extent of the infestation of the wool was almost unbelievable. Living moths were crawling over the floors, dozens of them were at the two or three windows and scores were crawling and flying about the wool while everywhere were hundreds of dead ones. Many of the fleeces were practically destroyed, the outer layers of wool, at least, being reduced to a mass of brownish frass, webs and fragments of wool fibers. Those fleeces deep within the pile of wool were less injured apparently than those

nearer the surface. No adequate estimate of the damage to the wool could be made without an examination of each fleece. The loss to the Produce Company can well be several hundred dollars.

The interesting feature of the situation was the fact that the clothes moths, apparently overcrowded in their original breeding place, had begun to migrate outward to establish themselves in less crowded situations. The moths had flown in large numbers to dwelling houses from 150 to 300 feet from the warehouse. At the same time, of course, they had become a serious menace to the households within the range of their dispersal.

Note on Anopheles of the Nyssorhynchus Group (Diptera: Culicidae).

By CHARLES H. T. TOWNSEND, Boa Vista (Rio Tapajós) Pará, Brasil.

While conducting a mosquito survey of Fordlandia, on the Rio Tapajós, it became necessary to distinguish the species of *Anopheles* in collected adult females. The key given by Dyar on page 427 of Mosquitoes of the Americas proved unsatisfactory when applied to hundreds of females of the six species of the Nyssorhynchus group abundant in individuals in and around the main settlement of Bôa Vista. The following key was then devised and found to work quite satisfactorily in nearly every case for separation of females in absence of the males.

1. Fifth hind tarsal with black ring at base..... 2
   Fifth hind tarsal lacking black ring..... 4
2. Fourth fore tarsal lacking white ring at tip, second hind tarsal at most scarcely over 1/3 and usually not over 1/4 black.....*gorgasi* D. & K.
   Fourth fore tarsal tipped with white ring, second hind tarsal at least well over 1/3 black.....3
3. Two largest costal black spots well separated, *albimanus* Wd.
   Two largest costal black spots subconfluent, *bachmanni* Petr.
4. Fourth fore tarsal tipped with white ring, second hind tarsal at least well over 1/3 black.....*albitarsis* La.
   Fourth fore tarsal lacking white ring at tip.....5

5. Second hind tarsal much less than 1/2 black, two largest costal black spots well separated.....*argyritarsis* R. D.
Second hind tarsal at least nearly 1/2 black, two largest costal black spots separated to subconfluent..*darlingi* Root

The employment in the above key of the character of the presence or absence of a terminal white ring on the fourth fore tarsal joint led at once to the discovery that *tarsimaculatus* Goeldi is a synonym of *albimanus* Wd. The *tarsimaculatus* of Howard, Dyar & Knab and subsequent authors is a distinct species without white ring on the fourth fore tarsal and the name *gorgasi* D. & K. is available for it.

Goeldi's var. *albipes*, for which he proposed the name *tarsimaculata*, thus equals *albimanus* Wd. His var. *albitarsis* equals *albitarsis* La. Dr. G. Hagmann, of Santarem, who did the work on Os Mosquitos no Pará under Goeldi's direction, confirms my findings in the premises.

Agonoderus pallipes Lec. (Coleop.: Carabidae).

By H. C. Fall, Tyngsboro, Massachusetts.

In a review of Robert A. Staig's book on the Fabrician Types of Coleoptera in the Hunterian Collection at Glasgow University (Ent. News, Nov. 1931), the writer called attention to an obvious ambiguity or uncertainty as to the identity of *Agonoderus pallipes*. According to Staig this species is represented by two specimens in the Hunterian Collection under the label "*Carabus pallipes* Fabr. MSS," the label as usual not being attached to the pin of either specimen, but gummed or pinned to the bottom of the box. The author says further—"The smaller specimen has one elytron wanting, the larger is without antennae. They correspond with Olivier's figure, but the larger one answers most nearly the description given by Fabricius and Olivier." He accordingly selects the larger specimen as the type and describes it as such. He then gives a separate description of the smaller specimen, but if I remember rightly ventures no opinion as to the significance of the differences that appear in the two descriptions.

The important differences are as follows. In the larger specimen (selected as the type) there are two supra-orbital

setae, the thorax is said to be orbicular with the sides very strongly rounded and with two marginal setae, the elytra are strongly striate punctate and the short scutellar stria is between the suture and the first long stria. In the smaller specimen there is only one supra-orbital seta, the thorax is roughly squarish with rounded hind angles, the sides less strongly rounded and with a single marginal seta, and on inquiry I learn from Mr. Staig that the elytral striae are impunctate and the scutellar stria lies between the first and second long striae.

It is obvious from the above and other considerations that the smaller specimen is truly an *Agonoderus,* but that the larger one is widely separated generically therefrom because of the two supra-orbital setae, while the two lateral pronotal setae, the punctate elytral striae and the position of the scutellar stria would be quite anomalous in *Agonoderus.*

In casting about for something answering to Staig's description of the larger Fabrician specimen I hit upon *Platynus limbatus* Say as a likely candidate. I accordingly sent Mr. Staig examples of this species together with *Agonoderus pallipes* and *A. comma* as they have been interpreted by American students. As a further test for *P. limbatus* I called attention to the presence of a mentum tooth and the tripunctate third elytral interspace in this species; points not mentioned in the Staig description.

After making careful comparisons Mr. Staig replied that in these latter respects as well as in all other essentials the larger Fabrician type agrees with the examples of *P. limbatus* sent and he has no doubt of their specific identity. He further concludes that the smaller Fabrician specimen is with reasonable certainty the same as *Agonoderus comma* as we understand it. If, as I suppose, the pronouncement of Staig constitutes type fixation, then our familiar *Platynus limbatus* Say becomes *Platynus pallipes* Fab. It would now be of much interest to compare the smaller *A. pallipes* of the Hunter Collection with the actual Fabrician type of *A. comma* as a test of the accuracy of our interpretation of the latter. Just where the type of *comma* is located is unknown to me, but I have urged Mr. Staig, as being more nearly on the ground, to have this comparison made if possible. As yet I have no word from him on the matter.

Having determined that the *Agonoderus pallipes* of Fabricius is really Say's *Platynus* (*Agonum*) *limbatus*, it becomes necessary to decide what name must now be used for our hitherto supposed *pallipes*.

In 1848 LeConte described his *Agonoderus dorsalis* as distinct from *pallipes* as understood by him, his belief at that time being that *comma* Fab. was not different from *lineola* of the same author. Chaudoir, in May, 1868, (Rev. & Mag. de Zool., p. 164), declared that LeConte's *pallipes* was not the *pallipes* of Dejean (which he assumed to be that of Fabricius) and that the latter was the same as LeConte's *dorsalis*. For this reason he proposed the name *lecontei* for the *pallipes* of LeConte. In Dec., 1868 (Proc. Phila. Acad.) LeConte, reviewing our species of *Agonoderus*, separates *comma* and *pallipes* as follows:

Hind angles of thorax rounded, scutellar stria long...*comma*.
Hind angles of thorax scarcely rounded, scutellar stria short, *pallipes*.

He suppresses his own *dorsalis* as a synonym of *comma* and writes *lecontei* Chaud. as a synonym of *pallipes* Fab., thus adhering to his previous interpretation of *pallipes*. From the above considerations it seems obvious that we must now substitute Chaudoir's name *lecontei* for the species we have called *pallipes* Fab. It should be stated that the name label *"dorsalis"* is at present attached to a Southern states specimen of *lecontei* (*pallipes* sens Lec.) in the LeConte collection. LeConte's description and remarks however better fit the more northern *comma*, and it would seem certain that the name label has either been misplaced or was carelessly attached to the present specimen by LeConte himself.

Correction (Hymen.: Sphecidae).

In my recent article "Disturbances in the domestic tranquility of *Chalybion caeruleum* (Hymen.: Sphecidae)" ENT. NEWS, Vol. XLIV: 51, 1933, I confused the maker of the nest under observation. *Sceliphron caementarium* was apparently the builder, not *Chalybion caeruleum* as stated. Phil Rau, Ann. Ent. Soc. Amer., Vol. XXI, No. 1:25, 1928, points out that *Chalybion caeruleum* does not build its own nest, but opens the nest of *Sceliphron caementarium* and substitutes its own prey and egg.—S. W. FROST, Arendtsville, Penna.

Several Species of Oak Aphids from Massachusetts (Homop.: Aphiidae).

By Forrest W. Miller, Department of Zoology, University of Pittsburgh.

Tuberculatus punctatella (Fitch)

Aphis punctatella Fitch, Trans. N. Y. St. Agr. Soc. 14, p. 869. 1855.

Color:—Apterous vivipara.—Entire body light yellow in color. Cauda, anal plate, antenna and legs concolorous with body. Alate vivipara.—Same color as aptera except tips of antennal segments III, IV, V and base of VI and the tarsi are dark brown. Veins of primary wings bordered with light fuscus; veins of secondary wings dark only at tips. Nymphs.—Same as the alate forms.

Measurements: — Alate vivipara. — Body 1.84-2.00 mm.; width through eyes .41 mm.; hind tibia .85-.97 mm.; hind tarsus .11-.13 mm.; antennal segment III-.57-.59 mm.; IV-.39-41 mm.; V-.36-.42 mm.; VI-.16 plus .76-.79 mm.; cornicles .046 mm.; cauda .09-.10 mm. Apterous female.—Body 1.23-1.41 mm.; hind tibia .43-.51 mm.; hind tarsus .09-.12 mm.; antennal segments III-.20-.24 mm.; IV-.18-.20 mm.; V-.19-.22 mm; VI-.11-.13 plus .23-.27 mm.; cornicle .03 mm.; cauda .09-.10 mm. Rostrum extending just beyond prothoracic legs.

Structural details:—Secondary sensoria round, flat numbering 4-6 on III, none on other segments of alate viviparae; absent in the apterous viviparae. Hairs blunt or slightly capitate .10-.12 mm. long on the body and .02-.04 mm. long on the legs and antennae of the apterous forms; much shorter and not modified at the tip in the alate forms. Cornicles smooth, concave at the center. Cauda short, slightly knobbed at the center and the annal plate indented in the apterous forms. In the alate, cauda knobbed, hairy; anal plate divided and hairy. In the alatae there are six pairs of tubercles on the dorsal part of the abdomen; the first are united at base, 1-3 have a single sensory hair on the apex, 4-6 smaller and with two hairs on apex. Two additional pairs of tubercles are located just anterior to the cornicles about half way between the cornicle and the median dorsal row of tubercles. Both have sensory hairs on apex. There are no lateral tubercles. Mediae of fore wing with 2nd fork .5 distance from the 1st fork to margin of wing.

Collection:—On *Quercus macrocarpa,* August 22, 1932, at Woods Hole, Massachusetts. Scattered over most of the under surface of the leaf, seldom found in groups. Quite common

in this region. For further description of the alate female see Baker (1917).[1]

NEOSYMYDOBIUS ALBASIPHUS (Davis)

Symydobius albasiphus Davis, Canadian Ent. 46:7, p. 226. 1914.

This species of aphid was collected upon *Quercus palustris* and *Q. Macrocarpa* in the region of Woods Hole, Massachusetts on July 23, 1932. Most of the trees were heavily infested; feeding taking place mostly upon the young stems and the petiole. All forms of this species have been described by Davis. The form collected in Massachusetts agrees in all cases with these accounts with the exception of segments V and VI of the antenna and the number of sensoria on III.

Lengths of antennal segments as given by Davis are as follows:

Alate female.—V-.182-.20 mm.; VI-.122 plus .078-.096 mm.

Number of sensoria on III, 7-8.

Comparative lengths of form collected in Massachusetts:

Alate female.—V-.158-.161 mm.; VI-.105-.115 mm., plus .065-.069 mm.

Number of sensoria on III, 8-10.

MYZOCALLIS ALNI (DeGeer)

Aphis alni DeGeer, Memoirs pour servir a l'histoire des Insectes, Tome 3, p. 74. 1773.

This species was first reported from the United States by Davis (1910) as occurring in Illinois, on the under sides of Alnus leaves. Granovsky (1928) describes all the various forms of the species and states that it is to be found only in Illinois, Oregon and British Columbia. Several specimens were collected upon *Quercus macrocarpa* at Woods Hole, Massachusetts, on August 20, 1932.

MYZOCALLIS DISCOLOR (Monell).

Callipterous discolor Monell, Bull. Geol. and Geog. Surv. U. S. v:1, p. 30, 1879.

This aphid, with smoky wings, occurs rather commonly in the region of Woods Hole, Massachusetts where it was collected

[1] Baker, A. C., Eastern Aphids. New or little known. Part II. Jour. Econ. Ent., 10:4, fig. 21.

upon oak, *Quercus macrocarpa,* from July 16, to September 1, 1932. The terminal filament of the sixth antennal segment of the forms collected is slightly longer (.27-.30 mm.) than given for the species by Knowlton (1929).[1] Also the number of sensoria on the third antennal segment is from 9-11 rather than from 2-6 as figured by Knowlton. This larger number of sensoria agrees well with Davidson (1920)[2] who says that discolor has eight sensoria along the entire length of the segment.

MYZOCALLIS BELLA (Walsh).
Aphis bella Walsh, Proc. Ent. Soc. Phila., p. 299, Dec. 1862.

Collections of this aphid were made upon *Quercus macrocarpa* and *Q. ilicifolia.* Feeding on both hosts takes place on the under side of the leaf along the veins.

MYZOCALLIS PUNCTATA (Monell).
Callipterus punctata Monell, U. S. Bull. Geol. and Geog. Surv. Terr. 5:1, page 30, 1879.

This species was collected on various species of *Quercus* from June 28 to September 1, 1932, in the region of Woods Hole, Massachusetts.

Request for Bibliographies.

We note in *The Entomologist's Record* of February, 1933, that Dr. Walther Horn has a "Request addressed to all entomologists of the world to help the Deutsche Entomologische Institut build up a bibliographical card index for international reference." The card index is to contain all titles which have been published in all branches of entomology in the world since 1864.

1. All entomologists are requested to publish or to compile lists of all their own entomological publications and to present or to lend one copy of such lists to the Deutsche Entomologische Institut, Berlin-Dahlem, Germany.

2. The attention of all younger entomologists is drawn to the fact that it would be very useful to number their entomological publications consecutively.

[1] Knowlton, G. F. 1929. Aphid notes from Utah. Pan-Pacific Entomologist 6:1, p. 39, fig. 5.
[2] Davidson, W. M. 1920. A new *Myzocallis* (Aphididae) Canad. Entomologist 52:6, pp. 176-177.

Entomological Literature

COMPILED BY LAURA S. MACKEY UNDER THE SUPERVISION OF E. T. CRESSON, JR.

Under the above head it is intended to note papers received at the Academy of Natural Sciences, of Philadelphia, pertaining to the Entomology of the Americas (North and South), including Arachnida and Myriopoda. Articles irrelevant to American entomology will not be noted; but contributions to anatomy, physiology and embryology of insects, however, whether relating to American or exotic species will be recorded.

The **figures within brackets** [ ] refer to the journal in which the paper appeared, as numbered in the list of Periodicals and Serials published in our January and June issues. This list may be secured from the publisher of ENTOMOLOGICAL NEWS for 10c. The number of, or annual **volume**, and in some cases the part, heft, &c. the latter **within** ( ) follows; then the pagination follows the **colon** :

All continued papers, with few exceptions, are recorded only at their first installments.

*Papers containing new forms or names have an * preceding the author's name.

(S) Papers pertaining exclusively to neotropical species, and not so indicated in the title, have the symbol (S) at the end of the title of the paper.

For records of Economic Literature, see the Experiment Station Record, Office of Experiment Stations, Washington. Also Review of Applied Entomology, Series A, London. For records of papers on Medical Entomology, see Review of Applied Entomology, Series B.

☞*Note the change in the method of citing the bibliographical references, as* **explained above.**

Papers published in the Entomological News are not listed.

GENERAL.—Curtis, W. P.—Meigen's "Nouvelle Classification." [8] 69: 38-41. **Donisthorpe, H.**—On recording entomological publications. [21] 45: 20-22. **Evermann, B. W.**—Obituary notice. By E. P. Van Duzee. [55] 9: 10. **Flint, W. P.**—Balancing the entomological program. [12] 26: 39-45. **Heikertinger, F.**—Ein besuch des V. Internationalen Kongresses für Entomologie in Paris. [79] 18: 227-244. **Holland, W. J.**—Obituary by A. Avinoff. [68] 77: 204-205. **Jellison & Philip.**—Faunae of nests of the magpie and crow in western Montana. [4] 65: 26-31. **Quayle, H. J.**—New quarters for work in entomology in the University of California at Riverside and Los Angeles. [12] 26: 288-291, ill. **Rupp, F.**—Noch etwas über insekten bei Homer. [14] 46: 225. **Weiss, H. B.**—The entomology of the "Orbis pictus" of John Amos Comenius together with notes on several early, American, entomological juveniles. [6] 40: 511-518.

ANATOMY, PHYSIOLOGY, ETC.—Bauer, H.—Die histologie des ovars von Tipula paludosa. [94] 143: 53-76, ill. **Beck, D. E.**—Life history notes and a study of the effects of humidity on adult emergence of Rhagoletis suavis from pupae at a constant temperature (Trypetidae). [6] 40: 497-500, ill. **Cros, A.**—Forme des stigmaces chez les larves primaires des Meloïdae et leurs modifications. [25] 37: 276-279. **Hering, M.**—Die farbe der Blattminen und verfärbungen minierter blätter. [Ent. Jahrb.] 1933: 78-81. **Marcu, O.**—Zur kenntnis der stridulationsorgane der gat-

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